What is Claimed is:

CLAIMS

1. A method for identifying peptide compounds derived from hsp70 which have at least one mutation or one modification with respect to the natural hsp70 sequence, said compounds bringing about a T response specific for tumors, comprising the following steps:

a) PCR-amplifying a DNA fragment encoding hsp70, obtained from one or more tumor(s),

b) cloning the DNA obtained in step a) into a vector capable of replicating in a bacterium,

c) sequencing said fragment in each bacterial colony obtained after culturing the bacteria of step b), and identifying the mutation(s) in hsp70,

d) determining the immunogenicity of the mutated peptide fragments among those identified in step c).

2. The method as claimed in claim 1, wherein step d) consists of an Elispot assay.

3. The method as claimed in either of claims 1 and 2, wherein the peptide fragments which have an anchoring sequence for a given HLA molecule are preferably tested.

4. The method as claimed in one of claims 1 to 3, wherein the peptide fragments to be tested in step d) are obtained by chemical synthesis.

5. A method for revealing artificial point mutations or modifications which can increase the immunogenicity of the mutated peptide compounds derived from hsp70, wherein it comprises the following steps:

a) determining fragments which have a sequence of approximately 9 to 10 amino acids comprising an anchoring motif for a given HLA molecule,

b) introducing an additional point mutation or modification (for example a post-translational modification) at residues 4, 5, 6, 7 or 8,

c) determining the immunogenicity of the peptide fragments obtained in step b).

6. The method as claimed in claim 5, wherein step c) consists of an Elispot assay.

7. A peptide compound which can be obtained using a method as claimed in one of claims 1 to 5, wherein it comprises a sequence of at least 8 consecutive amino acids of hsp70 which has at least one mutation or one modification with respect to the natural hsp70 sequence, and wherein it brings about a specific T response.

8. The peptide compound as claimed in claim 7, having at least 80% homology with the amino acids between positions 286 and 294 of hsp70.

9. The peptide compound as claimed in claim 8, wherein the amino acid at position 293 is preferably isoleucine, leucine, valine, alanine, glycine or phenylalanine, more particularly isoleucine.

10. The peptide compound as claimed in claim 9, which has at least the sequence SEQ ID No. 1 or SEQ ID No. 2.

11. The peptide compound as claimed in one of claims 7 to 10, wherein it comprises at least one element other than natural amino acids.

12. A DNA fragment encoding at least a peptide fragment of one of claims 7 to 11.

13. A vector for expressing a peptide fragment as claimed in one of claims 7 to 11, containing the DNA fragment of claim 12 fused to a promoter which is strong and effective in eukaryotic and/or in prokaryotic cells, in particular in human cells.

14. The expression vector as claimed in claim 13, also comprising one or more selection marker(s) and, optionally, one or more coding sequence(s) for factors which activate the immune defenses, such as cytokines and/or lymphokines.

15. The vector as claimed in either of claims 13 and 14, wherein it is a viral vector, a plasmid or a pseudovector.

16. A dendritic cell loaded with peptide compounds as claimed in one of claims 7 to 11.

17. A dendritic cell transformed with the expression vector as claimed in one of claims 13 to 15.

18. The dendritic cell as claimed in either of claims 16 and 17, wherein they belong to macrophages.

19. A pharmaceutical composition comprising a peptide compound, or a mixture of peptide compounds, as claimed in one of claims 7 to 11 and a pharmaceutically acceptable vehicle.

20. The pharmaceutical composition as claimed in claim 19, wherein it also comprises one or more immunological adjuvants, in particular factors which are cytotoxic for tumors.

21. A pharmaceutical composition comprising an expression vector as claimed in one of claims 13 to 15 and a pharmaceutically acceptable vehicle.

22. A pharmaceutical composition comprising in particular a DNA fragment as claimed in claim 12 and a pharmaceutically acceptable vehicle.

23. A pharmaceutical composition comprising the cells as claimed in one of claims 16 to 18 and a pharmaceutically acceptable vehicle.

24. A combination product comprising at least one peptide compound as claimed in one of claims 7 to 11 and at least one agent which induces cellular stress, for simultaneous or separate use, or for use spread out over time, intended for treating cancer.

25. The combination product as claimed in claim 24, wherein said agent is capable of inducing overexpression of heat shock proteins, in particular hsp70.

26. The combination product as claimed in claim 24, wherein said agent is an apoptosis inducer, selected in particular from DNA-damaging agents and glucocorticoid receptor ligands, or from pro-apoptotic second messengers.

27. The combination product as claimed in claim 24, comprising a viral vector which has a gene which encodes an enzyme for activating pro-apoptotic agents, in particular thymidine kinase.

28. The combination product as claimed in claim 24, in which the agent which induces cellular stress is selected from compounds which induce tumor hypoxia, in particular angiogenesis inhibitors.

29. The pharmaceutical composition as claimed in one of claims 19 to 23, or the combination product as claimed in one of claims 24 to 28, wherein it also comprises one or more immunological adjuvants, in particular agents which are cytotoxic for tumors.

30. The pharmaceutical composition as claimed in one of claims 19 to 23, or the combination product as claimed in one of claims 24 to 29, wherein it comprises a pharmaceutical vehicle which is compatible with IV, subcutaneous, oral or nasal administration.

31. The pharmaceutical composition as claimed in one of claims 19 to 23, or the combination product as claimed in one of claims 24 to 29, wherein it comprises a pharmaceutical vehicle selected from positively or negatively charged liposomes, nanoparticles or lipid emulsions.

32. The use of a peptide compound as claimed in one of claims 7 to 11 for manufacturing a medicinal product.

33. The use of a peptide compound as claimed in one of claims 7 to 11 for manufacturing a medicinal product intended for treating cancer.

34. The use of a peptide compound as claimed in one of claims 7 to 11 for manufacturing a medicinal product intended for immunization ex situ.

35. The use of a peptide compound as claimed in one of claims 7 to 11 for manufacturing a medicinal product intended for immunization in situ.

36. The use of a peptide compound as claimed in one of claims 7 to 11 for manufacturing a medicinal product intended for treating cancer, particularly solid tumors, especially carcinomas, melanomas, neuroblastomas and neck and head cancers, preferably renal carcinomas.

37. The use of a peptide compound as claimed in one of claims 7 to 11 for increasing, in culture medium, the tumor CTL population and/or inducing the secretion by said CTLs of cytotoxic factors, such as for example IL-2, IFN-γ or TNF.

38. The use of a peptide compound as claimed in one of claims 7 to 11 for manufacturing a medicinal product intended for stimulating the immune defenses, in particular so as to increase the tumor CTL population and/or induce the secretion by said CTLs of cytotoxic factors, such as for example IL-2, IFN-γ or TNF.

39. The use as claimed in one of claim 32 to 38, in combination with radiotherapy.

40. The use as claimed in one of claim 32 to 39 for performing repeated immunization for the purpose of causing a breakdown of tolerance against the corresponding natural peptide (nonmutated) in a patient.

41. A method for producing an antibody which binds to an hsp70 mutant, in particular to the hsp70-2 I-293 mutant, comprising the steps consisting in:

a) immunizing a mammal with a peptide compound as claimed in one of claim 7 to 11,

b) isolating a monoclonal antibody which binds to hsp70-2-293, particularly to hsp70-2 I-293, in an immunological assay.

42. A monoclonal antibody which binds to a mutated-hsp70 fragment, particularly to hsp70-2 I-293.

43. A method for detecting mutated hsp70, in particular the hsp70-2 I-293 mutation or modification, comprising the steps consisting in:

a) bringing a sample taken from an individual into contact with a monoclonal antibody as claimed in claim 42,

b) allowing the formation of the antibody/mutated hsp70 complex, in particular of the antibody/hsp70-2-293 complex,

c) detecting mutated hsp70 by means of a detectable label which is in the complex or which binds to the complex.

44. A diagnostic kit comprising in particular an antibody as claimed in claim 42, for detecting cancer.

45. A diagnostic kit comprising in particular an antibody as claimed in claim 42, for the prognostic of established cancer in an individual.

46. A pharmaceutical composition comprising in particular a monoclonal antibody as claimed in claim 42 and a pharmaceutically acceptable vehicle.

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